

CLAIMS

1. A control apparatus for a compression ignition internal combustion engine, wherein said control apparatus decides an amount of fuel injection and a target amount of intake air according to engine operating conditions of said compression ignition internal combustion engine, a vehicle driving condition of a vehicle and an intention of a driver, and controls a variable valve mechanism and/or an intake air regulating means so that an amount of intake air supplied to a combustion chamber becomes a target amount of intake air.

2. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein said control apparatus decides an amount of fuel injection according to engine operating conditions of said compression ignition internal combustion engine, a vehicle driving condition of a vehicle incorporating said compression ignition internal combustion engine and an intention of a driver of said vehicle incorporating said compression ignition internal combustion engine, calculates a target amount of intake air from the decided amount of fuel injection so as to attain a target air-fuel ratio and controls said variable valve mechanism and said intake air regulating means so that an ignition timing becomes a target ignition timing.

3. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein said control apparatus decides a target amount of intake air according to engine operating conditions of said compression ignition internal combustion engine, a vehicle driving condition of a vehicle incorporating said compression ignition internal combustion engine and an intention of a driver of said vehicle incorporating said compression ignition internal combustion engine and controls said variable valve mechanism and said intake air regulating means so that an air-fuel ratio becomes a target air-fuel ratio.

4. A control apparatus for a compression ignition internal combustion engine according to claim 3, wherein said control apparatus further performs feedback control so that an ignition timing becomes a target ignition timing.

5. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein said control apparatus operates an intake valve or an exhaust valve according to engine operating conditions of said compression ignition internal combustion engine, a vehicle driving condition of a vehicle incorporating said compression ignition internal combustion engine and an intention of a driver of said vehicle incorporating said compression ignition internal combustion engine and controls fuel injecting means and said intake air regulating means so that an air-fuel ratio becomes a target air-fuel ratio.

6. A control apparatus for a compression ignition internal combustion engine according to claim 5, wherein said control apparatus further performs feedback control so that an ignition timing becomes a target ignition timing.

7. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein said control apparatus controls said variable valve mechanism, fuel injecting means and said intake air regulating means according to engine operating conditions of said compression ignition internal combustion engine, a vehicle driving condition of a vehicle incorporating said compression ignition internal combustion engine and an intention of a driver of the vehicle incorporating said compression ignition internal combustion engine so that an air-fuel ratio becomes a target air-fuel ratio.

8. A control apparatus for a compression ignition internal combustion engine according to claim 7, wherein said control apparatus performs feedback control so that an ignition timing becomes a target ignition timing.

9. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein said control apparatus operates said intake air regulating means according to engine operating conditions of said compression ignition internal combustion engine, a vehicle driving condition of a vehicle incorporating said compression ignition internal combustion engine and an intention of a driver of said vehicle incorporating said compression ignition internal combustion engine and controls fuel injecting means and said variable valve mechanism so that an air-fuel ratio becomes a target air-fuel ratio.

10. A control apparatus for a compression ignition internal combustion engine according to claim 9, wherein said control apparatus further performs feedback control so that an ignition timing coincides with a target ignition timing.

11. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein said control apparatus controls said variable valve mechanism so that the intake valve has small lifts and the closing timing of an intake valve is advanced while an operating condition is in a low-speed and low-load state.

12. A control apparatus for a compression ignition internal combustion engine according to claim 11, wherein said control apparatus maximizes an amount

of intake air by said intake air regulating means while keeping an internal EGR rate constant.

13. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein said control apparatus controls said variable valve mechanism so that an amount of intake air into said combustion chamber is increased as an engine load increases in an operating area by compression ignition combustion.

14. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein said control apparatus controls said variable valve mechanism or said intake air regulating means so that a temperature of a mixture inside said combustion chamber increases at the start of a compression process as an engine speed increases in an operating area by compression ignition combustion so as to increase an internal EGR rate.

15. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein said control apparatus controls so that an amount of fuel injection increases as an engine speed increases in an operating area by compression ignition combustion.

16. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein said control apparatus controls so that an air-fuel ratio approaches a theoretical air-fuel ratio as an engine speed increases in an operating area by compression ignition combustion.

17. A control apparatus for a compression ignition internal combustion engine according to claim 1, wherein when compression ignition combustion is switched to spark ignition combustion, said control apparatus controls said variable valve mechanism so that an internal EGR rate is reduced compared with that during said compression ignition combustion.

18. A control apparatus for a compression ignition internal combustion engine according to claim 17, wherein when said compression ignition combustion is switched to said spark ignition combustion, said control apparatus controls said intake air regulating means so that an amount of intake air changes continuously.